

Serial No. 10/761,076

Docket No. 145523-1

REMARKS

Applicants appreciate the consideration shown by the Office as evidenced by the Office Action mailed on November 3, 2005. In that Office Action, the Examiner rejected claims 1-3, 5-15, 17-24, and 26-74. In this Response, Applicants have amended claims 1, 13, and 23. Claims 1-3, 5-15, 17-24, and 26-74 remain pending in this application, with claims 32-74 currently withdrawn from consideration on the basis of a restriction requirement. Applicants respectfully request favorable reconsideration in light of the above amendments and the following remarks.

1. Claim Rejections

Claims 1-3, 5-15, 17-24, and 26-74 were rejected under 35 U.S.C. 102 (a) or (c) as anticipated by, or, in the alternative, under 35 U.S.C. 103(a) as obvious over Asakawa et al., U.S. Patent No. 6,565,763 ("Asakawa"). Applicants respectfully traverse this rejection.

Asakawa does not anticipate independent claims 1, 13, and 23 of the present application as amended herein because this applied reference does not describe or imply a ceramic material that is nonporous. Moreover, the subject matter recited by claims 1, 13, and 23 of the present application, taken as a whole, is not obvious in view of Asakawa because this applied reference fails to suggest a ceramic material that is nonporous. Applicants' arguments on this point are identical to those presented in the previous Response, and are repeated below (see subsection A). Applicants then respond to the Examiner's remarks presented in the subject Final Office Action (see subsection B). Support for the amended limitation of nonporous material recited in instant claims 1, 13, and 23 can be found, for example, in paragraph [0028] of the originally filed application.

A. *Asakawa does not teach, suggest, or disclose nonporous material.*

First, Asakawa is silent on the issue of the porosity range of the material made by its disclosed process. No specific values are given, and the word "porosity" is not present in the reference. Second, Asakawa makes very clear that the invention it describes is directed to the production of materials having a high level of porosity. In column 6, lines 10-15, the very beginning of the Detailed Description section, Asakawa states, "The principle of the present invention is that a film or a bulk-molded product of a block copolymer or graft copolymer is formed, which copolymer is allowed microphase-separation, and then a polymer phase is selectively removed, thereby forming a porous film or porous structure having a pattern of

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the order of nanometers.” Moreover, the porous structures must have a high porosity, because “such a structure [formed by the disclosed process] has a **very large specific surface area**. Col. 14, lines 34-37.

The stark differences between the materials described in Asakawa and those claimed in the present application arise because Asakawa and the present application describe two very different processes. In Asakawa, a block copolymer is forced to undergo micro-phase separation, and then one of the separated phases is **selectively removed**, leaving behind a structure comprising the remaining phase and a high level of porosity disposed where the removed phase previously resided. Column 6, lines 10-15. On the other hand, in the present application, a block copolymer (BCP) is mixed with at least one ceramic precursor. The mixture assembles into an ordered structure, but in this case there is no phase separation of the BCP with selective removal of a constituent BCP phase; instead, the mixture is pyrolyzed to decompose at least a portion of the BCP, leaving behind carbonaceous material (paragraph 0032). As noted in paragraph [0028] of the present specification, “Voids left behind by the decomposition of block copolymer can be closed during pyrolysis, leading to a nonporous, dense material.” Asakawa is clearly directed at just the opposite result—the production of porous material.

B. Response to Examiner's Remarks

The Examiner stated, “It is not clear what porosity is being measured since the article of the instant invention appears to allow for closed porosity. Also, it appears from paragraph 32 of the instant disclosure in order for a dense or closed porosity carbon must be present however the instant claims are silent as to the presence of carbon.” Applicants respectfully submit that the Examiner is misconstruing the description of the article of the instant invention as presented in the aforementioned paragraph 32 and elsewhere in the instant application.

First, the Examiner may be interpreting sentences like that quoted above from paragraph [0028] as allowing for porosity that is “closed,” i.e., not interconnected with neighboring pores. However, this sentence actually refers to the elimination of pores through a closing action that occurs during pyrolysis. Pores that are present due to block copolymer decomposition are closed, that is, eliminated, during the pyrolysis step. The mechanism of this elimination is localized viscous flow of the precursor under the driving force of surface tension. See paragraph [0032] (“This leads to the elimination of voids left behind by the decomposition of block copolymer.”). The paragraph [0032] description of the elimination of pores adds to the explicit

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paragraph [0024] support for nonporous material as recited in the amended independent claims 1, 13, and 23.

Second, the presence of carbon is not described in the present application as being necessary for the formation of nonporous material, contrary to the Examiner's remarks. Paragraph [0032] clearly states that it is the viscous flow of the precursor that eliminates the pores, not the presence of carbon. The paragraph describes the role of carbon in the material: "...the carbon residue from the block copolymer prevents the formation of a featureless monolith of ceramic. As a result of eliminating voids [through the viscous flow of the precursor] and the presence of residual carbon, a lamellar nanocomposite that inherits the structural features of the self-assembled polymer is successfully obtained." The carbon serves as a boundary to delineate structure, but is not described to play a densifying role.

Based on the above discussion, Applicants respectfully submit that independent claims 1, 13, and 23, along with their respective pending dependent claims, are patentably distinct from Asakawa. Applicants respectfully request favorable reconsideration of the claims.

2. Information Disclosure Statement (IDS)

The Examiner stated that the IDS filed 9-23-05 failed to comply with 37 C.F.R. 1.97(c) because it lacked the requisite fee and because the copies of documents C3 and C4 submitted with the previous Response were not legible. Reference C3 is Monnier et al., "Cooperative Formation of Inorganic - Organic Interfaces in the Synthesis of Silicate Microstructures," *Science*, vol. 261, pp. 1299-1303, September 3, 1993. Reference C4 is Templin et al., "Organically Modified Aluminosilicate Mesostructures from Block Copolymer Synthesis," *Science*, vol. 278, pp. 1795-1798, December 5, 1997.

Applicants enclose herein copies of the two references, along with a new IDS as part of a Request for Continued Examination, and respectfully request consideration of all disclosed references.

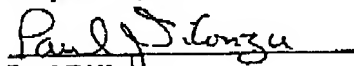
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3. Conclusion

In light of the remarks and amendments presented herein, Applicants believe that this serves as a complete response to the subject Office Action. If, however, any issues remain unresolved, the Examiner is invited to telephone the undersigned at the number provided below.

Respectfully submitted,



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Attachments: IDS